



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of
PURSELL, et al.
Appln. No.: 09/895,876
Filed: July 2, 2001

Confirmation No. 5376
TC/Art Unit: 1616
Examiner: Clardy, S.

RECEIVED

Title: CONTROLLED RELEASE AGRICULTURAL PRODUCTS AND
PROCESSES FOR MAKING SAME

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TECH CENTER 1600/2900

August 1, 2003

RESPONSE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Office Action dated May 6, 2003, reconsideration and allowance of the subject application are respectfully requested in view of the following remarks.

The applicant undersigned patent counsel wishes to express his appreciation to Examiner Clardy for the courtesy extended during the interview of July 16, 2003. It is sincerely believed that the interview materially advanced prosecution of this application.

With respect to the present Office Action, the applicant further appreciates the withdrawal of the previous rejection of the claims under 35 USC 112, second paragraph in view of the Amendment filed February 3, 2003.

The applicants respectfully traverse the rejection of claims 1-200 under 35 USC 103(a) in view of Huber US 4,657,582 (Huber '582), Huber US 4,923,506 (Huber '506),

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Wilson US 4,889,747, Lloyds et al. US 5,739,081 and Turnblad et al. US 5,876,739.

None of the cited references make the presently claimed invention to be obvious.

Huber '582 teaches polyhydroxy polymer/borate/salt, insoluble matrix having entrapped therein uniformly dispersed, discontinuous, domains of a biologically active agent, such as pesticides (see column 1, lines 43-68 of reference).

In contrast, the presently claimed invention includes a controlled release agricultural absorbent having particles containing voids and continuous capillaries which are impregnated with an agriculturally beneficial material (such as fertilizers and/or pesticides). The voids and capillaries are connected to the surface of the particle thus allowing the beneficial material to solubilize upon contact with water (such as rain) and be released slowly from the voids and capillaries into the soil. The Huber '582 granules form an insoluble matrix that seals the entrapped domains of biologically active agent from the surface of the granule and thus allows only the surface exposed domains to release the active agent into the soil.

Huber '582 teaches polyhydroxy polymer as a starting material prior to treatment with an inorganic salt and then reacting the resulting intermediate with boric acid/salt. The polyhydroxy polymer includes starches, such as corn starch, potato starch and other modified starches. A filler may optionally be added to the starting polyhydroxy polymer emulsion/dispersion. The pesticide is on the filler or salt (see column 3, lines 19-23 of reference) and the filler is blended into the initial emulsion/dispersion. There is no disclosure that the filler, including talcs, vermiculites, perlites, corn cob grits, etc. is of any advantage except to help hold the active agent during processing.

In contrast to Huber '582, one embodiment of the presently claimed invention includes absorbent particles, such as perlite, which have open, continuous capillaries and the particles are impregnated with an agriculturally beneficial material. Absorption within the perlite holds the beneficial material for delivery, for example to the soil. The small particles may be agglomerated into granules (see for example claim 15) wherein upon exposure to water, the small particles slowly come apart from the granule, thus providing another slow release control mechanism. In another embodiment, an interspatial blocker such as a dilute solution of starch may be mixed with the agriculturally beneficial material wherein the absorbent particles are impregnated in an amount of 40-95% of the capillaries/voids of the particles. By controlling the viscosity of the blocker and the amount of impregnation, the interspatial blocker controls the release of the beneficial material as it solubilizes after application to the soil (see for example claim 35).

Huber '582 uses a filler, such as perlite, as a "filler", i.e. a material added to increase bulk. The biologically active agent is expressly taught as being on the filler at column 3, line 23 of the reference. When employed in the presently claimed invention, the absorbent, e.g. perlite forms the granule and is an integral part of the control release mechanism by containing the beneficial material within the voids and capillaries. The presently claimed invention employs an expanded perlite (see for example claim 50) and in other embodiments, perlite plus the interspatial blocker as for example in claim 59. Unlike Huber '582, the presently claimed invention does not employ an inorganic salt or boric acid/salt to make Huber's insoluble matrix. Huber's product is insoluble

(see column 1, line 59) whereas the interspatial blocker of the presently claimed invention is soluble.

The presently claimed invention is fully allowable under Section 103(a) in view of the prior art.

The teachings of Huber '506 do not remedy the deficiencies of Huber '582.

Huber '506, in a manner similar to Huber '582, discloses slow release matrix carried biologically active agent whereby a starting material of polyhydroxy polymer such as starch, is mixed with an inorganic salt to form a coagulated matrix composition which holds water soluble biologically active materials (see column 1, lines 10-13, 37-47 and 52-60; and column 2, lines 22-42).

In contrast, the presently claimed invention includes a controlled release agricultural absorbent having particles containing voids and continuous capillaries which are impregnated with an agriculturally beneficial material (such as fertilizers and/or pesticides). The voids and capillaries are connected to the surface of the particle thus allowing the beneficial material to solubilize upon contact with water (such as rain) and slowly be released from the voids and capillaries into the soil. The Huber '506 granules seal the entrapped domains of biologically active agent from the surface of the granule.

The polyhydroxy polymer includes starches, such as corn starch, potato starch and other modified starches. A filler may optionally be added to the starting polyhydroxy polymer emulsion/dispersion. The pesticide is on the filler or salt as specifically taught at column 1, line 55 and column 3, line 20 of the reference, and the filler is blended into the initial emulsion/dispersion. There is no disclosure that the filler,

including talcs, vermiculites, perlites, corn cob grits, etc. is of any advantage except to help hold the active agent during processing.

In contrast to Huber '506, one embodiment of the presently claimed invention includes absorbent particles, such as perlite which have open, continuous capillaries and the particles are impregnated with an agriculturally beneficial material. Absorption within the perlite holds the beneficial material for delivery, for example to the soil. The small particles may be agglomerated into granules (see for example claim 15) wherein upon exposure to water, the small particles slowly come apart from the granule, thus providing another slow release control mechanism. In another embodiment, an interspatial blocker such as a dilute solution of starch may be mixed with the agriculturally beneficial material wherein the absorbent particles are impregnated in an amount of 40-95% of the capillaries/voids of the particles. By controlling the viscosity of the blocker and the amount of impregnation, the interspatial blocker controls the release of the beneficial material as it solubilizes after application to the soil (see for example claim 35).

Huber '506 uses a filler, such as perlite, as a "filler", i.e. a material added to increase bulk. The biologically active agent is expressly taught as being on the filler at column 1, line 55 and column 3, line 20, of the reference. When employed in the presently claimed invention, the absorbent, e.g. perlite forms the granule and is an integral part of the control release mechanism by containing the beneficial material within the voids and capillaries. The presently claimed invention employs an expanded

perlite (see for example claim 50) and in other embodiments, perlite plus the interspatial blocker as for example in claim 59.

In contrast to Huber '506, the presently claimed invention does not employ an inorganic salt to make Huber's matrix, which solidifies and entraps the active agent. In Huber, the agent is mixed into a thick paste and the matrix is precipitated out upon addition of the salt (see column 2, lines 32-42). The thick paste would only cling to the surface of the filler, rather than penetrate it, in contrast to the impregnation of the absorbent particle of the presently claimed invention.

The applicants submits that the presently claimed invention is fully allowable under Section 103(a) in view of the prior art.

The cited reference of Wilson does not remedy the deficiencies of Huber '582 and Huber '506.

Wilson teaches how to make expanded perlite water repellent, i.e. hydrophobic by applying a silane emulsion (see column 2, lines 31-37). This provides a water repellent construction material such as an insulator and which may further have a biocide additive (see column 2, lines 50-57). Wilson's water repellent perlite is made by preparing an emulsion of a silicone compound, using an emulsifying agent, a buffering solution, and water (biocide and/or other things like colorants can also be added). This emulsion is absorbed into the perlite and the resulting perlite is dried, leaving the silicone inside along with other ingredients.

The presently claimed invention includes the use of an absorbent, such as perlite, however, the Wilson approach is contrary to the present invention. The

presently claimed invention employs an absorbent that is water attracting, i.e. hydrophilic in order to encourage penetration of the agriculturally beneficial material. Wilson specifically teaches “reduced water absorption” at column 2, line 27 and teaches “increasing the resistance to penetration by aqueous media by expanded perlite” at column 2, lines 59-60. The expanded perlite is conventional popped perlite (see column 3, lines 15-18 of reference) and does not refer to the exfoliated perlite of other embodiments of the presently claimed invention (see for example, claims 63 and 69) as explained at page 23, line 19 to page 25, line 20, at page 37, line 21 to page 38, line 14 and shown in Figures 2, 3 and 4 of the present application. Moreover, when the presently claimed invention includes an interspatial blocker, the absorbent, e.g. perlite, provides for the penetration of the mixture of blocker and beneficial material. Certainly, the presently claimed invention does not suggest the application of a hydrophobic material such as silane.

The applicants submit that a person of ordinary skill in the art would not consider the teachings of Wilson when contemplating the presently claimed invention. There is no suggestion or motivation to combine the teachings of Wilson with the remaining references. The applicants assert that the combination is not tenable and should accordingly be withdrawn.

Even if the teachings of Wilson were considered in combination with the teachings of the cited art, such combination would not make the presently claimed invention to be obvious for the several reasons discussed above.

The presently claimed invention is fully allowable under Section 103(a) in view of the prior art.

The cited reference of Lloyd does not remedy the deficiencies of Huber '582, Huber '506 and Wilson.

Lloyd teaches water dispersible granules made of very small particles that are absorbent and carry biologically active substances in liquid form. The granules break up and the particles released in the water by a dispersing agent such as a surface active agent or a water-soluble polymer. The dispersed particles are sprayed through a nozzle (see column 2, line 61 -column 3, line 5).

According to Lloyd, the granules are prepared from agglomerated or extruded small particles such that they quickly disperse on application and contact with water. The particles, which may be an expanded perlite (i.e., conventional popped perlite), are held together in the granule by either a specific binder or by the application of the dispersing agent itself (see column 5, lines 6-35). There is no slow or even controlled release aspect to the Wilson granule. The Wilson granule is designed to immediately fall apart and disperse in water because of adding the dispersing agent.

In Lloyd, all of the active ingredients are applied after the granules are made which leads to poor levels of absorption of the active agent by the granules (see column 6, lines 58-63 of reference). In the present invention, the beneficial material is applied to the absorbent particles prior to granulation for better absorption.

In contrast to Lloyd, the presently claimed invention includes granules of absorbent that are to a controlled degree, glued together by excess agriculturally

beneficial material with or without the presence of excess interspatial blocker. The particles of the presently claimed invention will come apart in a controlled (usually slow) manner upon application of water (e.g. rain) and then extended release the beneficial material in a controlled manner.

The Lloyd granule falls apart and disperses almost instantly upon contact with water because of the dispersing agent.

The applicants submit that a person of ordinary skill in the art would not consider the teachings of Lloyd when contemplating the presently claimed invention. There is no suggestion or motivation to combine the teachings of Wilson with the remaining references. The applicants assert that the combination is not tenable and should accordingly be withdrawn.

Even if the teachings of Lloyd were considered in combination with the teachings of the cited art, such combination would not make the presently claimed invention to be obvious for the reasons discussed above.

The presently claimed invention is fully allowable under Section 103(a) in view of the prior art.

The cited reference of Turnblad does not remedy the deficiencies of Huber '582, Huber '506, Wilson and Lloyd.

Turnblad teaches making a coating to apply to seeds, which contains among other possible ingredients, a binder, an insecticide, and a filler (see column 1, lines 29-39). According to Turnblad the combination of a binder in which the insecticide is dispersed, protects the seeds and seedlings from otherwise sometimes inflicted

damage by the insecticide. The binder, which may be starch, serves as a matrix to hold the insecticide, as disclosed at column 2, lines 55-60 of the reference. The binder may further contain a filler, which may or may not have an absorbent character. The fillers include perlite, however, there is no suggestion of using expanded perlite and certainly not the exfoliated perlite of the presently claimed invention.

Additionally, the binder of Turnblad is taught to bind the insecticide and may superficially hold the filler in the coating on the seed. In contrast to the presently claimed invention there is no suggestion of impregnating an absorbent with an agriculturally beneficial material with or without an interspatial blocker.

In Turnblad, the binder is mixed with the insecticide and filler such that when sprayed on the seed, the insecticide becomes slow release and the seed is protected.

The applicants submit that the art of Turnblad is not related to that of the presently claimed invention. A coating of a seed would not be contemplated by a person of ordinary skill in the art when considering the presently claimed absorbent.

The applicants submit that a person of ordinary skill in the art would not consider the teachings of Turnblad when contemplating the presently claimed invention. There is no suggestion or motivation to combine the teachings of Turnblad with the remaining references. The applicants assert that the combination is not tenable and should accordingly be withdrawn.

Even if the teachings of Turnblad were considered in combination with the teachings of the cited art, such combination would not make the presently claimed invention to be obvious for the reasons discussed above.

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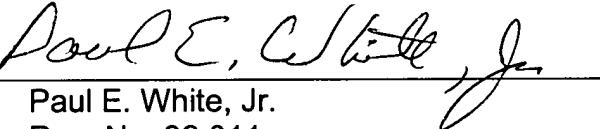
The presently claimed invention is no where disclosed suggested or made obvious by the teachings of the prior art. The presently claimed invention is fully allowable under Section 103(a).

In view of the above, it is believed that the present application is in condition for allowance and a Notice to that effect is respectfully requested.

Respectfully submitted,

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